

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A digital signal transceiver comprising:

a frequency modulator for outputting a ~~first high-frequency modulated signal~~ frequency modulated with a digital signal input thereto in a transmitting mode, and for outputting a ~~second high-frequency non-modulated signal~~ in a receiving mode, the second high-frequency signal being not modulated and containing a phase noise different in level from a phase noise in the first high-frequency signal, said frequency modulator comprising:

a variable frequency oscillator and

a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving the signal output from the variable oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal;

a power amplifier for receiving a the modulated signal output from the frequency modulator;

an antenna terminal arranged to be connected to an antenna;

an antenna switch comprising

a first branch port for receiving a signal output from the power amplifier,

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode, and

a second branch port connected to the common port in the receiving mode;

a filter having an input port thereof connected to the second branch port of the antenna switch;

a high-frequency amplifier having an input port thereof connected to an output port of the filter; and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator.

2. (Currently Amended) The digital signal transceiver according to claim ~~1~~ 15, wherein the level of the phase noise in the ~~second high frequency modulated~~ signal ~~has a level~~ is larger than ~~a the~~ the level of the phase noise in the ~~first high frequency non-modulated~~ signal.

3. (Currently Amended) The digital signal transceiver according to claim 1, wherein the signal output from the variable frequency oscillator has a frequency varying according to a signal input thereto, and

wherein the frequency modulator further comprises

a reference signal generating unit for generating a first reference signal,

~~a variable frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto,~~

~~a first frequency divider for frequency dividing the signal output from the variable frequency oscillator,~~

a phase comparator for comparing a signal output from the first frequency_ divider unit with the first reference signal in phase, and

a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator.

4. (Currently Amended) The digital signal transceiver according to claim 3, wherein a frequency of the first reference signal ~~has a frequency in the transmitting mode is~~ higher than a frequency of the first reference signal in the receiving mode.

5. (Currently Amended) The digital signal transceiver according to claim 3, wherein the reference-signal generating unit comprises

a reference signal generator for generating a second reference signal, and

a second frequency divider unit for outputting the first reference signal by frequency-dividing the second signal by a first dividing rate in the receiving mode, and by frequency-dividing the high-frequency signal by a second dividing rate larger than the first dividing rate in the transmitting mode.

6. (Original) The digital signal transceiver according to claim 3,

wherein the variable frequency oscillator comprises a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto, and

wherein the frequency modulator further comprises a charge pump for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode and a second current larger than the first current in the

receiving mode to the low-pass filter according to the signal output from the phase comparator.

7. (Original) The digital signal transceiver according to claim 3, wherein the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

8. (Currently Amended) A digital signal transceiver comprising:

a frequency modulator for outputting a ~~first high-frequency~~modulated signal ~~frequency modulated with a digital signal input thereto~~ in a transmitting mode, and for outputting a ~~second high-frequency~~non-modulated signal in a receiving mode, ~~the second high-frequency signal being not modulated~~, said frequency modulator comprising:

a reference signal generating unit for generating a first reference signal having a frequency in the transmitting mode lower than a frequency in the receiving mode,

a variable-frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto,

a first frequency divider ~~for frequency dividing the signal output from the variable frequency oscillator~~unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable oscillator and a modulating signal and outputting a modulated signal,

a phase comparator for comparing ~~a one of the modulated signal or the non-modulated signal output from the first frequency divider~~unit with the first reference signal in phase, and

a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator;

a power amplifier for receiving a signal output from the frequency modulator;

an antenna terminal arranged to be connected to an antenna;

an antenna switch including

a first branch port for receiving a signal output from the power amplifier,

a common port connected to the antenna terminal, the common port being connected to the first branch port in the transmitting mode, and

a second branch port connected to the common port in the receiving mode;

a filter having an input port thereof connected to the second branch port of the antenna switch;

a high-frequency amplifier having an input port thereof connected to an output port of the filter; and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator.

9. (Original) The digital signal transceiver according to claim 8, wherein the reference signal generating unit comprises

a reference signal generator for generating a second reference signal, and

a second frequency divider for outputting the first reference signal by frequency-dividing the second reference by a first dividing rate in the receiving mode, and by frequency-dividing the high-frequency signal by a second dividing rate larger than the first dividing rate in the transmitting mode.

10. (Original) The digital signal transceiver according to claim 8,

wherein the variable frequency oscillator comprises a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto, and

wherein the frequency modulator further comprises a charge pump for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode and a second current larger than the first current according to the signal output from the phase comparator.

11. (Original) The digital signal transceiver according to claim 8, wherein the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

12. (Currently Amended) A digital signal transmitting and receiving apparatus comprising:

a frequency modulator for outputting a ~~first high-frequency~~modulated signal ~~frequency-modulated with a digital signal input thereto~~ in a transmitting mode, and for outputting a ~~second high-frequency~~non-modulated signal in a receiving mode, ~~the second high-frequency signal being not modulated,~~ the frequency modulator comprising:

a reference signal generating unit for generating a reference signal,

a voltage-controlled oscillator for outputting ~~a one of the modulated signal or the non-modulated~~ signal having a frequency varying according to a voltage input thereto,

~~a frequency divider for frequency dividing the signal output from the variable frequency oscillator unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the voltage-controlled oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the voltage-controlled oscillator and a modulating signal and outputting the modulated signal,~~

~~a phase comparator for comparing a one of the modulated signal or the non-modulated signal output from the frequency divider unit with the reference signal in phase,~~

a charge pump for receiving the signal output from the phase comparator and for outputting a first current in the transmitting mode and a second current in the receiving mode according to the signal output from the phase comparator,

a low-pass filter receiving the first and second currents and outputting the signal input to the voltage-controlled oscillator,

a power amplifier for receiving an output signal from the frequency modulator;

an antenna terminal arranged to be connected to an antenna;

an antenna switch comprising

a first branch port for receiving a signal output from the power amplifier,

a common port connected to the antenna terminal, the common port being connected to the first branch port in the transmitting mode, and

a second branch port connected to the common port in the receiving mode;

a filter having an input port thereof to the second branch port of the antenna switch;

a high-frequency amplifier having an input port thereof to an output port of the filter;
and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator.

13. (Previously Presented) The digital signal transmitting and receiving apparatus according to claim 12, wherein the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

14. (Currently Amended) A digital signal transmitting and receiving apparatus comprising:

a frequency modulator for outputting a ~~first high-frequency~~modulated signal ~~frequency modulated with a digital signal input thereto~~ in a transmitting mode, and for outputting a ~~second high-frequency~~non-modulated signal in a receiving mode, ~~the second high-frequency signal being not modulated,~~ the frequency modulator comprising:

a reference signal generating unit for generating a reference signal,

a variable-frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto,

a frequency divider unit for frequency dividing the signal output from the variable frequency oscillator that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable oscillator and outputting the non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal,

a phase comparator for comparing a one of the modulated signal or the non-modulated signal output from the first frequency divider unit with the reference signal in phase, and

a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator, the low-pass filter having a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode;

a power amplifier for receiving a signal output from the frequency modulator;

an antenna terminal arranged to be connected to an antenna;

an antenna switch comprising

a first branch port for receiving a signal output from the power amplifier,

a common port connected to the antenna terminal, the common port being connected to the first branch port in the transmitting mode, and

a second branch port connected to the common port in the receiving mode;

a filter having an input port thereof connected to the second branch port of the antenna switch;

a high-frequency amplifier having an input port thereof connected to an output port of the filter; and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator.

15. (New) The digital signal transceiver according to claim 1, wherein a phase noise in the non-modulated signal has a level different from a level of a phase noise in the modulated signal.